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August, 1919

# Psychological Bulletin

EDITED BY

SHEPHERD I. FRANZ, GOVT. HOSP. FOR INSANE  
HOWARD C. WARREN, PRINCETON UNIVERSITY (*Review*)

JOHN B. WATSON, JOHNS HOPKINS UNIVERSITY (*J. of Exp. Psych.*)

JAMES R. ANGELL, UNIVERSITY OF CHICAGO (*Monographs*) AND

MADISON BENTLEY, UNIVERSITY OF ILLINOIS (*Index*)

WITH THE CO-OPERATION OF

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THE  
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AN EXPERIMENT TO DETERMINE THE RELATION  
OF INTERESTS TO ABILITIES

BY ROSS HARTMAN AND J. F. DASHIELL

*Oberlin College*

In matters of vocational guidance there is some uncertainty as to the relation between one's interests and his abilities in those things in which he is interested, and this is a crucial point. Presumably, the vocational guidance expert should take some account of a man or woman's present likes and dislikes as a possible clue to his future likes and dislikes, if that person is to be happy in his work. But here the factual basis is not at all clear; the subtleties with which interests change and are changed by manifold intrinsic and extrinsic factors make attempts at prognosis practically worthless in the present condition of our knowledge. Again, the expert should, and does to some extent, make reliable measurements of capacity or ability possessed by the subject now as a basis for the prediction of later capabilities. The basis in facts here is somewhat better; one's relative abilities seem to change very little; and the scientific demand is for more and more adequate tests. Finally, whether he should or should not, the vocational guide very commonly makes his analysis of present capacities (and presumably of future possibilities) by an analysis of his subject's respective interests. Particularly with the grossly unscientific expert this method of extracting from a person a knowledge of his likes and dislikes now as the basis of prediction as to abilities now and later smacks of the charlatan. It has little demonstrated support in facts. Exhaustive studies of the question from many different points of approach are needed.

The present experiment is an attempt to apply only one of the

several possible methods, admittedly a crude one. Essentially it was by employing the method of ranking (a) relative abilities and (b) relative interests in six simple forms of psychological tests.

The subjects were thirty-one juniors and seniors in the summer session at Oberlin College.

The following six processes were prepared and given to the subjects: (1) *Word Completion*. Blanks were given to the subjects having "skeletons" of sixty words on them. A few of the letters of each word were given to provide a clue to the rest of the word; and the subjects were asked to fill out the missing letters. The subjects were graded here upon the number of words they filled out correctly in five minutes of time. (2) *Code Writing*. The subjects were given blanks having at the top of the page a double-number code for the letters of the alphabet and below it a passage to be translated into the code. The subjects were graded upon the number of letters of the passage they translated correctly in five minutes of time. (3) *Immediate Retention of Visual Impressions*. Ten pieces of cardboard were prepared having upon them "tit-tat-toe" frames with pictures or symbols painted upon them. The first one of these was very simple, and the others grew more complex in the order in which they were given. Each frame was shown for a period of five seconds, and the subjects were asked to reproduce as much of the figure as they were able to remember. They were graded in this manner: two points were given for each symbol reproduced in its proper place in the "tit-tat-toe" frame, and one point was given for each symbol reproduced correctly, but in the wrong position in the frame. (4) *Arithmetical Problem*. A problem was prepared which had some forty steps, and in which the answer to one step is needed in the following step. The steps were of such a nature as to be as nearly equal in difficulty throughout as possible. The subjects were given five minutes to work in, and were graded upon the number of steps they solved correctly. (5) *Pitching Pennies*. Each subject pitched ten pennies toward a line nine feet away, and the average distance of the pennies from the line was measured for each student. (6) *Letter Cancellation*. A card was given to each subject having a large number of letters printed upon it apparently promiscuously. The subjects were asked to cancel the A's and the O's; the one who finished first put up his hand, and the rest were stopped at that point.

After going through these six processes each subject was asked to denote his range of interests in them, assigning a 1 to the process

most interesting, a 2 to the process second in interest, and so on throughout the list. The results of the tests were then graded, and for each individual it was found in which process he was the best, in which the second best, and so on through the list. These ranges in ability were found by first ranking the different subjects of the whole group according to ability in each process, then finding the order of ability and the order of interest for each subject in all processes. Thus the subjects' ranks for ability were found, not by comparing their scores with absolute standards, but by comparing each individual's scores with those of the rest of the class. These two ranks, of abilities and of interests, once found for the subjects, they were correlated for each individual, and the degrees of correlation for all averaged. This average was found to be 0.243. A table showing the individual correlations is given here:<sup>1</sup>

Subjects	Positive Correlations	Negative Correlations	Subjects	Positive Correlations	Negative Correlations
1	.143	...	17	.915	...
2	.315	...	18	.486	...
3	.657	...	19	.143	...
4	...	.371	20	...	.199
5	.143	...	21	...	.200
6	.657	...	22	...	.371
7	.657	...	23	.143	...
8	.315	...	24	.486	...
9	...	.200	25	.315	...
10	.143	...	26	.143	...
11	.486	...	27	.315	...
12	.657	...	28	.143	...
13	.143	...	29	.657	...
14	.314	...	30	.143	...
15	...	.200	31	.513	...
16	.143	...			

The result found is qualified somewhat by the fact that several of the students did not experience a definite difference of interest among the six processes, and consequently assigned their ranks of interest more or less arbitrarily. However, if ranks of interest were assigned absolutely arbitrarily, the correlation for the whole class would approximate 0.000. As it was, twenty-five of the thirty-one subjects showed positive correlation; and the highest individual positive correlation found was 0.915, while the highest negative correlation found was 0.371, and the average for the whole class was 0.243.

<sup>1</sup> As determined by Spearman's "Foot-Rule" formula:  $R = 1 - \frac{6\sum g}{n^2 - 1}$

The figures given are thought to have some significance in the light of two considerations: (a) the indirectness of the method of calculating ranks in ability; and (b) the nature of the activities used, these being mostly paper-and-pencil tests of the traditional types and presumably not calculated to arouse as varied interests as would activities chosen from wider fields.

### TESTS OF DISCRIMINATION AND MULTIPLE CHOICE FOR VOCATIONAL DIAGNOSIS

BY DAGNY SUNNE

*Tulane University*

As part of the testing of disabled soldiers for the purpose of vocational diagnosis, at the Callendar Laboratory by Professor Fletcher and the writer, the Yerkes multiple choice apparatus and the McComas discrimination apparatus were utilized very satisfactorily. The multiple choice apparatus used was one made at Clark College under the direction of Professor Porter. At first the problems were of the type suggested by the work of Yerkes and Porter, which had already been tried by some of our students in experimental psychology. These consumed too much time and as we had no sufficiently standardized results, it was difficult to form a comparative estimate of a man's ability in the memory-reason processes tested. So it was decided to try out a problem similar to that reported by Professor J. Peterson.<sup>1</sup> The subjects were told that the twelve keys had been numbered at random and that the point of the test was to see how quickly they could learn the number of each key so that they would be able to go through the series from 1 to 12 without a mistake. The keys, counting from left to right, were numbered: 4, 6, 12, 1, 5, 8, 2, 9, 11, 7, 10, 3. The subject was instructed that the key numbered 1 would make the lamp light; when he had succeeded in locating it, that key 2 would make the lamp light, and so on for each number up to 12. Every key struck was recorded. The results were scored as suggested by Peterson, according to the number of errors: (1) unclassified, (2) illogical, (3) perseverative, (4) both illogical and perseverative. The apparatus helped to make the men less self-conscious and made the testing of the slower ones much less taxing than the scheme tried by Peterson.

<sup>1</sup> *Psychol. Rev.*, 25, 443-467.

The discrimination apparatus was constructed and operated according to the directions given by Professor McComas.<sup>1</sup> Every man was given a preliminary drill to familiarize him with the key corresponding to each of the four colors and then had three trials, each one continuing till sixty correct reactions had been made. The number tested was smaller than for the Multiple Choice experiment, as we found an unusually large percentage of color-blind among these men.

Most of these men were also given the army Alpha test, the Cube test according to Pintner's standardization and the Healy Picture Completion test II scored by the 1918 rating. The correlation coefficients ( $r$ ) given in table I throw some light on the results of these tests as compared with the other three tests. These

TABLE I

	Alpha Test		Multiple Choice		Discrimination		Cube Test	
	No.	Cor.	No.	Cor.	No.	Cor.	No.	Cor.
Multiple Choice.....	40	.16	—	—	—	—	—	—
Discrimination.....	35	.19	53	.09	—	—	—	—
Cube Test.....	43	.39	51	.68	44	.38	—	—
Picture Completion.....	43	.34	44	.25	44	.25	43	.23

No. = Number of cases. Cor. = Correlation coefficient.

coefficients show, as has been proved by the actual progress of the men, that the Alpha test rating would have been unfair to some of these men, if used as the basis for selecting vocational courses. Two men who were among the very lowest according to the Alpha test were among the highest in the multiple choice and discrimination tests. Limited educational opportunities explained this discrepancy. On the other hand, two men who received very high Alpha scores were among the lowest in both the other tests because they easily became confused and lost their self-control when situations were a little unusual or difficult. The highest correlations were found to be those of multiple choice with the discrimination and cube tests. Some of the contrasts in these performances, too, were as striking as the similarities. The men who came sixth and second from the top in the discrimination test were eleventh and twelfth from the bottom in multiple choice. The cube test showed high correlation only with the multiple choice test, but very different characteristics were also brought out by the two tests.

<sup>1</sup> *J. of Exper. Psychol.*, 2, 171-177.

Only one man of the highest group in multiple choice got the highest score in the cube test, the rest had low or medium scores. The mean was 7.2, lower than Pintner's average for 39 adults, which was 8.

Healy's picture completion test gave such surprising results when tried with our college students that it seemed profitable to use it with these men also. The mean for 45 college students was 68.3 and the scores ranged from 24.5 to 100. The men's scores ranged from -15.5 to 85, with a mean of 43.36. The low correlation with the discrimination and especially with the multiple choice test indicates the differences in the memory, reasoning, and perception processes tested. From these limited observations it appeared that the cube test tried out quickness of perception and immediate retention; the discrimination test more complicated memorizing and speed of judgment under stress; the picture completion test the ability to notice and retain under varying conditions several important details and to choose consistently with not only the immediate but the previously observed concrete factors of the situation, just as the multiple choice test seemed to try out similar abilities with reference to more abstract factors.

In the discrimination test the records showed the number of seconds required and of errors made to get 60 correct reactions. Five seconds for each error were added to the time of the third trial and the 44 scores ranged from 346 to 49 seconds. They comprised a very low group (of 6) in which the errors in the third trial were more numerous than in the second, the mean of the time for 60 correct reactions 259 seconds, and the mean of the errors 25.6; a medium group (of 20) in which with three slight exceptions the errors decreased in the third trial, the mean of the time scores was 110.3 and the mean of the errors 8.2; a high group for which the mean of the time scores was 67.7 and the mean of errors 2.1. In this last group the three highest scores were obtained by men who made no errors and had an average time of 53.3 seconds for 60 correct reactions. The mean of the time scores for all 44 men was 113.1 and the mean of the errors 8.1 for 60 correct reactions. The time score in each case includes the 5-second penalty. Of the men in the lowest group in the discrimination test, four got D scores in the Alpha test, one got C, and another next to the highest Alpha score. This last man, though quick and well-educated, became easily confused and excited and his career in the vocational

training school has clearly proved him undependable under stress. In the highest group in the Discrimination test, two men received D in the Alpha test (the highest record was made by a D man), one B, one A, and the rest C scores.

In the multiple choice experiment all the men who made the poorest records also had Alpha test scores of C minus, D, or D minus, and those who made the best records varied from C minus to A in the Alpha test. Six of the men examined were so very slow and dull, that when their scores reached 1,000 with only two to five keys learned, the test was discontinued. Thus the results for the lowest group are inaccurate, but give some indication of the relation of the different kinds of errors. The following Table II gives the mean of the total scores computed by counting each unclassified error 1, each illogical error 2, each perseverative error 2, and an error both illogical and perseverative 3, and arranged in four groups according to the total scores. In group I, the total scores range from 1,000 to 800, in group II from 660 to 305, and in group III from 300 to 143, and in group IV from 100 to 32. The figures for the 45 men give the means for the 45 who completed the test excluding the six whose score was arbitrarily set at 1,000. The percentage of total errors for each type of error is shown in Table II. The figures in parenthesis give the number in each group.

TABLE II

	Total Score	Unclassified	Illogical	Perseverative	Ill. and Per.
Group I (10).....	970.1	273.7	255.6	33.0	45.7
Group II (16).....	433.1	132.0	115.3	14.3	13.2
Group III (18).....	213.0	74.9	53.0	8.2	4.6
Group IV (7).....	80.0	38.5	17.4	2.0	0.7
All 51.....	413.8	126.7	107.3	14.1	16.7
45 men.....	332.9	111.0	86.6	10.6	9.4

TABLE III

	Unclassified	Illogical	Perseverative	Ill. and Per.
Group I.....	46.2%	41.9%	4.9%	6.9%
Group II.....	48.0%	41.5%	5.2%	4.8%
Group III.....	53.2%	37.5%	5.9%	3.2%
Group IV.....	65.7%	29.7%	3.4%	1.2%

The most conspicuous features of these results are the increase in the unclassified errors and the decrease in the illogical errors and

in errors both illogical and perseverative. The increase in the unclassified errors is mostly due to the fact that many of the better subjects used some systematic method, beginning at one end of the board, at the middle, and so on, and thus might have to strike more keys than those who made random attempts. The learning curves of these subjects showed no sudden drops, though most of the better subjects made rapid decrease in errors, as also did some of the very slow. In the case of the latter, the number of errors increased again, while the former would continue to blunder about one or two keys. The appearance of perseverative errors and errors both illogical and perseverative marked some of the last trials of several of the more intelligent men, apparently because they would not be convinced that a certain key was not right. The men who obtained the three highest scores made neither perseverative errors nor errors both perseverative and illogical, and five of the best group made no errors of the latter kind.

TABLE IV

	Total Score	Unclassified	Illogical	Perseverative	Both Ill. & Per.
Group I.....	232.7	74.0	59.3	11.9	5.5
Group II.....	64.8	43.1	9.3	1.1	.28
All 16.....	159.3	60.5	37.4	7.1	3.3

TABLE V

	Unclassified	Illogical	Perseverative	Both Ill. & Per.
Group I.....	49.0%	39.3%	7.9%	3.6%
Group II.....	80.1%	17.2%	2.1%	0.5%
All 16.....	55.8%	34.5%	6.6%	3.1%

Sixteen girls in the experimental psychology class also took the multiple choice test. Four of them made no perseverative nor illogical perseverative errors, six made none of the latter type, and the girl who made the best score, learning the whole series in one trial, had only 33 unclassified errors in her record. The lowest total score was 284 and the next lowest 281. According to total scores, the class can be divided into two groups, group I consisting of nine girls whose scores range from 433 to 152, and group II of seven girls with scores from 93 to 33. Table IV gives the means of the different kinds of error for each of these groups and Table V the percentage of the total number of errors for each type of error.

Here also, the increase in unclassified errors combined with

decided decrease of the other kinds is evident in the record of the better group. In the case of these students, too, the test brought forth some of their predominant characteristics. An average student got the lowest score, one of the best the next lowest, and a very mediocre student the highest score. The first girl gets easily excited and is apt to do much random work; the second is very persistent and will continue the course she has determined upon, no matter how long it takes, till it is conclusively proved wrong; the third is capable of unusually effective performance in work about which she is enthusiastic. So the results of the test agree with traits that are not obvious in the class-room. Together with the tests already mentioned the disabled men also had several tests of motor ability and the results of the combined experiments have proved of considerable value in recommending vocational courses.

## THE FUNCTION OF PSYCHOLOGY IN THE REHABILITATION OF DISABLED SOLDIERS

BY BIRD T. BALDWIN

(Formerly Chief Psychologist and Director of Occupational Therapy, Walter Reed General Hospital, Takoma Park, D.C.)

### I. INTRODUCTION AND HISTORICAL ORIENTATION.

Walter Reed was the first Army General Hospital to have a trained psychologist detailed to its staff; it is the purpose of this *report* to formulate and present briefly the functions of psychology in a reconstruction hospital as they have been worked out inductively during the war period, from April 17, 1918, to April 17, 1919.

The energies of the Psychological Service at Walter Reed have gone into practical remedial applications to meet the war and peace emergencies, into the discovery and formulation of new problems, into the demonstration of results and into the training of others in the work. This, in the main, has been due to the Army policy, the developing of facilities, the shifting of problems after the signing of the Armistice and to the large turnover of patients with short residence at the Hospital.

The first fundamental problem which presented itself was, *What contribution is psychology prepared to make in the rehabilitation of the disabled soldier?* After the determination of the particular

needs and purposes which psychology could and should subserve, the second problem orientated from *the adaptation of the psychological point of view and technique to the problems and administration of an Army Hospital.*

For the first month the writer worked alone, selecting a few typical cases, analyzing them in detail, and presenting the results in brief form to the medical or educational officer who appeared to be most in need of the information. It was apparent from the beginning that the function of psychology must be demonstrated in a limited field and with a view to conservative but steady expansion through the methods of definite accretion of results along lines where need was distinctly apparent; this method was adopted and constantly held during the year which followed.

During the first two weeks the writer carefully examined 20 disabled men and presented the results of each in his first fortnightly report. Few cases required the same form of procedure but a condensed summary of the first case as given in the original report will indicate the method as a working type.

In order to get a synoptic picture of the patient, it should be noted that this case-study (Pvt. R. G. P.) included an examination of the personal, social and intellectual status of the individual with an analysis of his vocation and special aptitudes. Suggestions were made with the approval of the surgeons, as to types of curative and educational treatment needed, recommendations were given for future vocational guidance with a view to helping the man formulate his future plans and aiding him directly in making the necessary adjustments for their realization. He was given an initial psychological insight into his own reconstructive program and shown, by concrete example, some of the things that he could do which were not apparent to him. He was led to feel the need for preparation for future work and recreation.

In addition to the clinical study of the patient's social, educational and vocational history, intelligence ratings were given with particular reference to motor coöordinations, since the disability was one of chronic osteo-arthritis of the metaphalangeal joints of the right hand. In mental army examination Alpha he made 212 points (C plus) which is the upper limit of the middle or average group for privates; in the performance test, 216 points (C) or the lower limit of the first quartile (77 per cent); in the army revision of the Stanford-Binet, a mental age of 15 (I.Q. 94 per cent. or C plus); in the Stenquist test for mechanical experience, 74 per cent.;

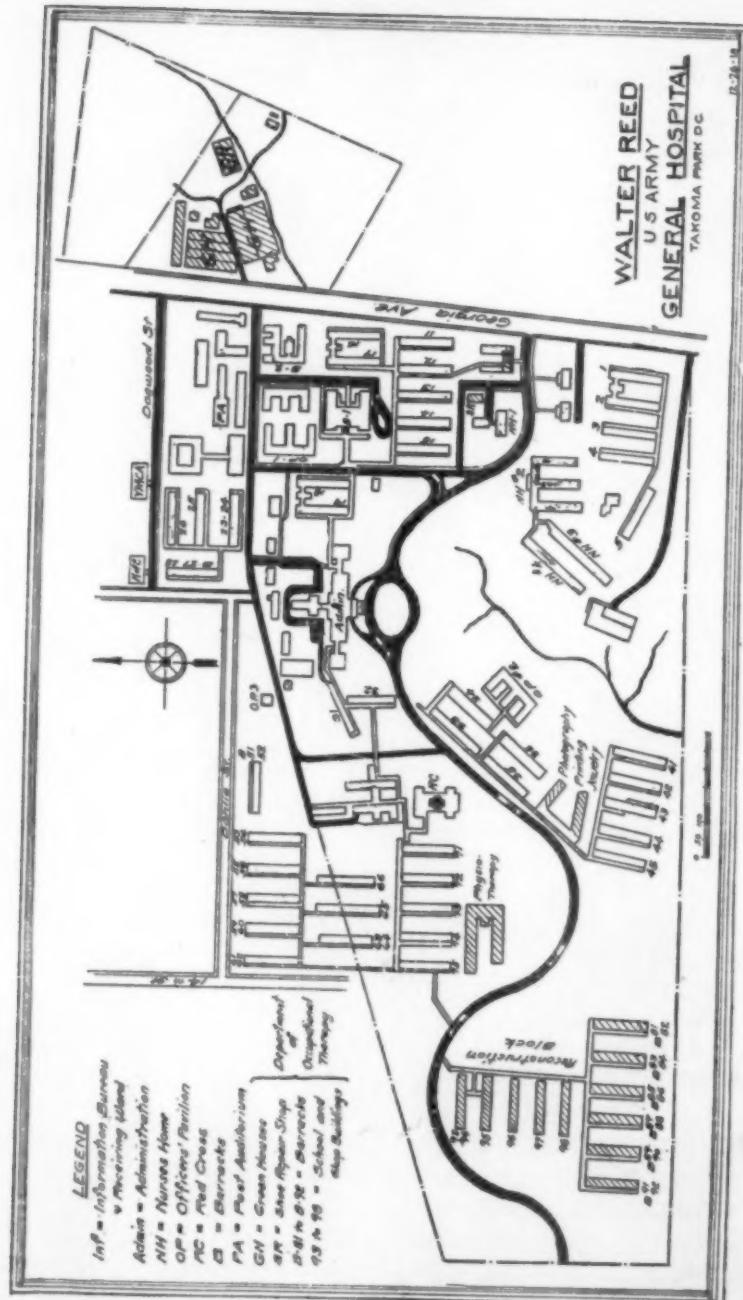
in the Army Trade Tests, journeyman in sheet metal working. The case was one of long standing and complicated social history with four courts martial, accompanied by a pronounced mental attitude of "waiting" and distrust, fostered by letters from a shiftless brother at home, both parents being deceased.

A portion of the report discussed the voluntary movements of the parts of the affected hand in detail.

This first case demonstrated the need of a synoptic picture of the (a) personal and (b) social history of the patient through intelligent interviewing; (c) educational rating as a basis on which reconstruction courses could be planned; (d) intelligence rating as a criterion of mental capacity for future training; (e) a trade rating as a point for future vocational reference; an analysis of (f) mental attitude, (g) interests, (h) aptitudes, (i) special abilities, and (j) morale for a basis of evaluating initiative and effort; an analysis of the (k) range and extent of voluntary movement in disabled parts for the applications of occupational therapy; and the (l) psychology of learning in motor control. It was soon found that the fundamental problem was one of developing the right mental attitude in the disabled man and also in assisting the hospital staff, visitors, the public and relatives to assume a wholesome relationship toward the patient. These main problems, outlined in the writer's first fortnightly report, furnished the program for the Psychological and Educational Service during the subsequent year, the chief psychologist also having been made Chief Educational Officer May 12, 1918.

The reconstruction work began in two rooms of an abandoned house, known as the Lay Homestead built on the sight of the Lay farm house which served as a "look-out" for Confederate soldiers during the Civil War. It was destroyed by shell fire at the suggestion of President Lincoln. At the beginning, the Director had two assistants and five reconstruction aides. In October there were in the Division, 140 officers, non-commissioned officers, privates, 100 reconstruction aides and a few civilians. The work was distributed in sixty-five different wards and eight new buildings were completed and equipped for the courses; twelve hundred wounded men were enrolled for several months. The cut on page 270 shows the plan of the hospital.

A number of psychologists coöoperating in the hospital have contributed to the development of the different lines of psychological work into their various functions at Walter Reed. Doctor Buford



Johnson assisted for two weeks as a volunteer and Sergeants Bruce W. Moore and Edward J. Beck were detailed from Camp Greenleaf and remained several months. Captain Hughes Mearns was assigned temporarily for three weeks to the post and in July Lieutenant Louis A. Pechstein reported from Fort Riley for instruction and gave material assistance in the interviewing of patients and other assignments.

On July 18, 1918, the staff was increased by the voluntary assistance (three afternoons each week) of Doctor John W. Baird, and the full time of Doctor Ethel Bowman; both later became permanent members of the Hospital Staff. Doctor Baird threw his best efforts into the work until December 1, 1918, when he entered the Johns Hopkins Hospital, where he died February 9, 1919. He was particularly helpful because of his sympathetic interest in the general problem, his willingness to help in all phases of the work when emergencies arose, and his collaboration in the detailed scientific analysis of voluntary movement of disabled joints, with their remedial exercises. Doctor Bowman, from the beginning, began to assume the responsibility for the Laboratory work with curative joint cases. Doctor Eleanor Rowland Wembridge and Doctor Margaret E. Noonan emphasized for a short period the applications of psychology to bedside occupations. Sergeant Adam R. Gilliland devoted full time from July to September 30, assisting in the development of the problem of measuring the excursion of movements in joints. The important phase of measuring the strength of voluntary movement in disabled joints and amputation cases was initiated and developed by Captain Harold Richmond.

From the beginning of the psychological work, the surgeons in charge of the neuro-psychiatric wards learned to make constant use of the psychologists as consultants and for mental age ratings. On December 9, Captain Richard M. Elliott reported at the post for half time, where he was assigned, until his discharge from the Army in April, to the examination of patients in the neuro-psychiatric wards.

Captain Lindley Garrison also reported and was assigned to interviewing and trade testing. Later he assumed the responsibility of business manager of the *Come Back*. Captain L. W. Cole and Major George F. Arps reported at the Hospital for a short time. In July Sergeants Walter J. Greenleaf and Arthur M. Ottman reported for work in interviewing patients. Other men with special

psychological training, assigned to various phases of the work were Sergeants Osborne Williams, Edward Keaner, Joseph Blanchette, and Howard Booher, who reported from Camp Hancock in December. The educational instructors, Captain Frank Sanborne, Lieutenant Frank Lane and Mr. Adolph Shane, were particularly valuable in infusing psychological methods into their departments.

A majority of the instructors, occupational aides and medical-social workers have taken the psycho-educational point of view in their work in the restoration of functions of the disabled soldiers; psychology has also definitely influenced important phases of the medical and surgical services of the hospital. The director visited the Canadian Hospitals at his own expense and was in frequent conference with Majors Yerkes, Haggerty, Yoakum, and Terman.

## II. OUTLINE OF PSYCHOLOGICAL SERVICE

Since the medical and surgical services in the hospital gave individual treatment, the psychological service also rested on *individual diagnosis* as opposed to group methods of army camps.

The individual patient was undergoing comparatively rapid physiological changes and mental adjustments and a progressive synoptic picture based on repeated examinations from different angles was found to be more desirable than a cross-section rating. The point of contact between the psychologist and the patient was remedial and curative; the analysis and direction of the patient's ideational and emotional background became of greatest importance, and mental tests as a rule, aside from cases of mental deficiency, served a subsidiary function.

The patient had met a series of unusual experiences and an injury with its accompanying physical shock and mental disturbances, therefore his adjustment to the limitations which his disabilities apparently or by necessity impose upon him, his readjustment to the inhibitions of army hospital life and his readjustment to many new social conditions that played on him in the hospital from a new angle bordering on misdirected charity, became significant factors influencing his normal recovery.

The patient's rehabilitation was also conditioned by his general intelligence, his outlook (which soon narrowed after he realized the extent of his injury), his training, his personal initiative, his temperamental reactions or individual morale. The fundamental problem was to help the patient "find himself" and to help him to desire to be an independent, self-directing public asset rather than an economic or social liability.

Briefly stated the scope of the psychological work consisted of:

- I. Surveys to obtain information regarding the patient's:
  - (a) Personal, social, educational and vocational history.
  - (b) Special interests, aptitudes and abilities.
- II. Examination to determine intellectual capacities and analyze mental abnormalities:
  - (a) Group and individual examinations of general intelligence for additional evidences of patient's fitness for a given curative occupational assignment or for permanent vocational training consisting of:
    1. Alpha examination for high grade literates.
    2. Stanford-Binet and Point Scale examinations for low-grade literates.
    3. Army performance test for literates and illiterates.
  - (b) Individual psychological examination for patients exhibiting special mental abilities or disabilities including:
    1. Examination requested by neuro-psychiatrists as an aid in diagnosis and disposition of their patients.
    2. Examination of psychiatric cases not interviewed and assigned to curative work through the usual methods, owing to their special defects and susceptibilities with assignment of such cases either to ward occupations, ward gardens, shops, typewriting, etc.
    3. Investigation of psychological causes of special cases of maladjustments, with counsel to patient and general recommendations.
- III. Examinations to determine skill in various occupations, by means of trade tests:
  - (a) In order that the patient may be assigned to curative work which may at the same time furnish vocational training, whenever such is possible.
  - (b) For the information of the Federal Board for Vocational Education and the Limited Service Board of the Army.
- IV. Measurements of voluntary movement and muscular strength in disabled joints:
  - (a) Procedure.
    1. Measurement in degrees of the range of voluntary movements of various joints in isolation.
    2. Measurement in pounds of the strength of muscles governing the various movements in upper and lower extremities.
  - (b) Purpose.
    1. To obtain necessary information for proper assignment to curative work.
    2. (a) Adapted to limited powers of the patient.  
(b) As required for sufficient exercise to develop increased function of the partially disabled limb.
    3. To obtain in numerical and graphical form, reports which may be used:
      - (a) To encourage and stimulate the patient to persist in the curative work by showing him definitely the progress of improvement.
      - (b) To furnish the surgeon and physiotherapist definite information as to the patient's progress.
      - (c) To keep the instructor informed in order that he may adapt his work to the changing needs.
- V. Work on the learning problem with a view to determining and applying the most effective methods of teaching:

- (a) In developing greater use of the remaining or uninjured limb by transferring functions to it.
- (b) In training for effective use of prothesis, the artificial limb, or of a partially disabled limb.
- (c) In applying psycho-educational measurements.

VI. Development of morale:

- (a) By inducing a proper attitude on the part of the patient in regard to his disability and his future by:
  1. Showing him what others similarly handicapped have done.
  2. Showing him that the hospital treatment is really producing beneficial results.
  3. Making clear what steps the Government has taken to provide for his future in the way of compensation, insurance and vocational rehabilitation.
- (b) By providing opportunities for the patient's recreation and amusement while in the hospital:
  1. Through the agencies of the Red Cross, Y. M. C. A., K. of C., and J. W. B.
  2. Through the use of the gymnasium and athletic field for athletics, dancing, etc.
  3. Through educational excursions to Mt. Vernon, the Capitol, etc.

VII. Further projected psychological work not carried out during writer's command:

- (a) Measurements of sensitivity in cases of palsied or sutured nerves.
- (b) Measurements of speed and accuracy of movement.

### III. INTERVIEWING, AND PSYCHOLOGICAL TESTS

It was found that the rapport established through the first interview is of great importance. This meeting should be at the bedside if possible, short, informal, with the avoidance of copious notes, and with an opportunity for the interchange of experience, the establishment of friendship and the patient's confidence with clues for future coöperation. This should be followed by an interval for gathering additional information and an opportunity for the interviewer to familiarize himself with available data from the medical histories and other sources, which give a good background for a second interview and an assignment.

Special effort was made in the interview to discover the existence and character of special interests, abilities, and aptitudes which might be used for curative, occupational and vocational ends. Additional clues were furnished by a qualitative analysis of the performance tests and other psychological examinations, by impromptu educational and trade tests, by observation and by the evaluation of the man's capacities from various angles by the interviewer.

In the original psychological record blank, formulated in

the main by a group of psychologists at conferences at the National Research Council,<sup>1</sup> there were more than 150 questions for each patient covering physical, personal, social, educational and occupational data. These blanks were soon materially modified into a briefer form which was later supplanted by Form 58, calling for approximately 78 items and including many of the essentials of the original sheet. It was frequently desirable where a man's previous educational history was not available nor clearly outlined, to make, by means of measurement scales, an educational diagnosis or examination of the degree of attainment in subject matter in algebra, arithmetic, drawing, English, French, geography, German, grammar, handwriting, history, language and composition, Latin, physics, reading, Spanish, or spelling. Under ordinary conditions a survey of the man's ability in oral and silent reading, spelling, speed and quality of writing, fundamentals in arithmetic and reasoning was sufficient, supplemented by Reasoning Test No. 2 in the Army Alpha examination.

This psychological service dealt with adults who had had serious disabilities and in many cases prolonged emotional attitudes which had to be recognized, tactfully met, and finally brought back to normal channels of reaction. Examinations and tests were not ends in themselves, but merely preliminary means for determining the disabled soldier's capacities and possibilities for remedial training. The aim of the psychologist was to understand the man's mental attitude and direct his reactions into normal, healthy forms of expression. The disabled man must ultimately know what he can do and be led to feel a keen, healthy enjoyment in his own accomplishments. In short, he must learn to function again as a complete man, within his limitations. In many instances this purpose was best accomplished through a *rappoport* gained from informal bedside conversations where the psychologist was a colleague and friend, rather than through the formal application of examinations in the laboratory. Occasionally group conferences and talks were desirable, but in the end a clear diagnostic picture was essential, accompanied by a constructive remedial program or the diagnosis failed in its fundamental purpose.

Among the important suggestions the psychologist bore in mind in this connection were the avoidance of undue fatigue of the patient, of misdirected emotionalism or the attitude of pity

<sup>1</sup> This committee was composed of W. C. Bagley, J. W. Baird, Major B. T. Baldwin, Mable R. Fernald, S. I. Franz, F. N. Freeman, Major M. E. Haggerty, E. K. Strong, Major R. M. Yerkes, and Helen T. Woolley.

or condolence, and of suggestions which will enhance the disabled soldier's discouragement or make him more sensitive in regard to his disabilities or handicap.

(a) *Trade Testing*

From the inauguration of psychological work at Walter Reed, the psychologists were called upon to rate the proficiency of convalescing patients in various army occupations. Before the armistice was signed, if a man was unfitted, as a result of a certain disability, to resume his duties with his former unit, the question arose as to whether the man should be retained in service, and if so, what branch of service he should be assigned. The War Department under necessity of utilizing all available man power, adopted the policy of retaining for domestic duty men who were not physically fit for full service provided they were 80 per cent. efficient in any army trade or specialty. The methods used were two-fold; first, the occupational survey by means of which information was secured as to the amount and type of experience of the patient, and second, the Trade Tests, by means of which the degree of trade ability, skill and judgment could be evaluated. The Trade Tests enable the examiner to rate the candidate as novice, apprentice, journeyman or expert, each of these designations connoting an increasing degree of proficiency in the order given. In a group of 119 patients, for example, 30 different trades were represented ranging from novice to expert. Of another group of 75 patients (July, 1918) representing 32 trades, 49 had had two years or more of training and the others less; of another group of 156 patients (July, 1918) representing 54 trades, 96 had had two years or more training and the remainder had less. Of these 31 were from amputation wards, 72 from orthopedic wards, 44 from medical wards and 9 from neuro-psychiatric wards. The occupational survey included the main occupation, years engaged, just what the worker did, name of firm, kind of business, department or branch, weekly wage, reasons for leaving, stability of employment, member of union, second occupation, third occupation, army experience, patient's occupational "preference" with reason. The general tendency was for the disabled soldier to pass through a period of instability, with his preference shifting from one line of occupation to another, and after he had spent a long period in a hospital almost any type of constructive activity would make a strong appeal to his imagination. The end in view was to give

the man an understanding of his possible future, to stimulate him to undertake the work necessary for reeducation.

The purposes for which the Trade Tests have been given may be summarized under the following heads:

1. Ratings for the Surgeon's Certificate of Disability Board indicating whether the disabled soldier should be retained in service or not.
2. Ratings for the limited service board stating the branch of service or occupation to which limited service men should be assigned or transferred.
3. Ratings to assist in making proper educational assignments in the reconstruction shops. The Trade Tests give information regarding the stage at which the student's training should begin and prevent his being given instruction or occupation which is too elementary.
4. Ratings to assist in vocational counsel and guidance. Vocational guidance was given after a thorough study of the case which included standard psychological examinations to determine the degree of intelligence, a qualitative psychological diagnosis for the purpose of discovering whether the man possessed any special aptitudes or abilities, a try-out in the shop under technically trained men and in Trade Tests.
5. Ratings for the Federal Board for Vocational Education. When the disabled man was ready for discharge, he was interviewed by representatives of this organization with reference to further training under their auspices. Reports on individual cases are furnished to assist in arriving at a decision on further training of a case; the grade of training with which he may begin and the amount of instruction which will probably be required to bring his knowledge up to the point where it will insure self-support.

#### (b) *Neuro-Psychiatric Cases*

Practically all patients recommended for S. C. D. on the basis of mental deficiency were examined individually by a psychologist at the request of the psychiatrist in charge of the neuro-psychiatric wards; and it was found that some of these patients rated as low as four years mentally, and others with an adult intelligence of A by the Army Alpha Scale.

The psychopathic patients, either with abnormal development of a few mental traits, or retarded mental development in general, were systematically interviewed on consecutive visits, and the examinations were supplemented by a careful study of the medical, social and psychiatric history of the patient, with personal inquiries formulated leading in the direction of the analysis of the pathological mental phenomena in question.

From December 15 to March 1, Captain Elliott, for example, examined one hundred patients with a distribution of tests used as follows: Alpha Examination, 10; Stanford-Binet, 73; Point Scale, 3; Performance, 14, which is representative of the frequency of distribution of tests used during the year by other psychologists.

The median mental age of distribution for all neuro-psychiatric cases examined was between ten and eleven years.

#### IV. MEDICAL SOCIAL WORK

One phase of work of psycho-social import for army hospitals, initiated and developed at Walter Reed, has been the use of medical-social workers with special training in social welfare and the elementary rudiments of medicine. This department began in January under the direction of Dr. Edna Henry, who was followed for a short period by Miss Ruth Emerson and then by Miss Louise Hoyle. The purpose has been to secure such personal and social data about the patient as will assist the accurate diagnosis, or lead to a speedier recovery and a safe discharge from the service. On May 1, 1,154 cases had been systematically interviewed and remedial forms of amelioration put into action through conferences and correspondence.

The scope of activities of the new department was divided into three general fields:

1. New admissions into the hospital.
2. Acute and convalescent patients within the hospital.
3. Disposition and after-care of discharged cases. For example, in April, 1919, the number of patients visited within a week of admission was 203. They were individually reported to the Reconstruction Department, Red Cross, American Library Association, Federal Board for Vocational Education, Insurance Officer, Ward Surgeon and other agencies. Of those about to be discharged and referred to the After-care Department of the Red Cross there were 125; and 205 patients were acute or convalescent cases within the hospital receiving extended treatment or were cases on furloughs.

An inductive survey of the case records shows that the main problems arising between the aide and the new patients were difficulties involved in, or information relative to compensation, government insurance, allotments, Liberty Bonds, back pay, reconstruction work, furloughs, artificial limbs, opportunities for recreation, information regarding one's home, the regulations of the hospital. For those in the hospital in the after-care section, the conferences and lectures orientated around the family history, social and financial status, reputation and industry, educational life, housekeeping standing, deterioration since the war, the attitude of parents toward patient, attitude of man toward his com-

munity, marriage complications, love affairs, divorce, preparation of the family for the type of injury on the part of the patient, need of supervision in the home, living accommodations, church or recreational opportunities and opportunities for future training.

The influence of a bright, attractive social worker who depended more on her personality than on science, met the situation as follows:

Patient was referred to worker by reconstruction interviewer as one who refused work. When aide first visited patient, he was found in the last bed of the ward, his face turned to the wall, and with traction fastened to his stump. When spoken to he just responded, and that was all; he did not even turn his face from the wall. Worker asked one or two questions and patient answered only "yes" or "no" and said that he was not interested in anything.

At the second visit, patient still seemed uninterested but did turn to see the mail the aide brought at that time. Worker asked if he read very much. "No, I don't read anything and I don't want anything to read," he replied.

At the third visit worker took a copy of *Dere Mabel* and asked patient if he had read it. He said "No," so worker explained that it was written by a Lieutenant of the 27th Division, that it contained the letters of a soldier to his girl, etc. She read the first two letters, left the book and went away. This was Saturday; when the worker returned Monday patient was sitting up, and before the worker could say "Good Morning," said "Where were you yesterday: I waited for you all day. I want that other book."

The other book was secured immediately. When that was finished, he asked for other books, also asked to do leather work, and was much interested in all that was going on in the ward. He talked freely of himself, his family, plans for the future, etc. He improved rapidly and was transferred from the ward to the shops for work.

That these problems have a direct medico-social significance in the treatment of the case is shown by the fact that during one month 103 patients were referred to the medico-social workers by the ward surgeons in both the medical and surgical services of the hospital. That the medical-social worker can ferret out valuable information for the ward surgeon, reconstruction department, psychologists and the administrative authorities of the hospital, may be indicated by a brief summary of one of the many difficult cases:

After repeated interviews, Private — (leg amputation case) refused to take work — says he never has worked regularly, and now his mother says he need not. He has a father, mother, and five sisters and a brother; has reached only the fourth grade in school, and while he has done some auto work, he states he never intends to work again after discharge from the army.

The information from the home service representatives shows that this patient was employed six different times by a company which employs the father, and discharged five times by the same company before he entered the army, and that he is a "loafer." He was arrested eight times in his community for drinking, theft and disorderly conduct. His furlough home apparently did him harm, since he began to go back rapidly to his old habits, when among his former associates.

The psychological examination shows the patient to be a high-grade moron with marked criminal tendencies; the type of a derelict who no doubt will require following up for several years. The family will also need bolstering up.

Another type of after-care is illustrative:

Our Red Cross Visitor had a very satisfactory call upon the family of Private ——. She found an unusually sympathetic and appreciative reception. The family is of the better class of Hebrew type, self-made and naturally intelligent though of comparatively little education. The boy's nervous trouble is much better and he has gained fifteen pounds weight since returning to his home. Is in good condition, "feels fine" and does not need medical attention at present. He has not yet made application for compensation though perfectly aware of his right to do so and is keeping up his insurance. Is at present helping his father in the shoe store, where he is needed, but the father says he will not stand in his way of change if it will be for his advancement.

Home service will keep in touch with the family and render them any assistance necessary.

#### V. OCCUPATIONAL THERAPY

Occupational therapy for the functional restoration of disabled joints, as stated in a previous monograph,<sup>1</sup> is based on the principle that the best type of remedial exercise is that which requires a series of specified voluntary movements involved in the ordinary trades and occupations, physical training, play or the daily routine activities of life. The curative shops were organized on the principles which enabled us to isolate, classify, repeat, and to a limited degree standardize and control the type of movements involved in the particular occupational and recreational operations. The patient's attention was repeatedly called to the particular remedial movements involved; at the same time these exercises had the advantage of being initiated by the patient and of forming an integral and necessary part of a larger and more complex series of coordinated movements. The periodic measurement of the increase in range and strength of movement made it possible for the patient to observe his recovery from day to day; and frequent comparisons between his progress curve and that of others offered good opportunity for explanations which helped him to overcome plateau periods or regressions that necessarily occurred. In addition to evoking an attitude of sustained interest, cheerfulness and optimism in the patient by showing him that he really was making progress, thus directly encouraging voluntary effort and personal initiative,

<sup>1</sup> Baldwin, Major Bird T., *Occupational Therapy Applied to the Restoration of the Functions of Disabled Joints*. A Walter Reed monograph printed by the Department of Occupational Therapy, 1919. 67 pp., 48 plates.

the records also enabled the examiner to determine which mode of treatment lead to the greatest and most consistent gains in a particular case.

The practice of formal mechanotherapy, or formal medical gymnastics, which has been so widely used, consisting of exercises of a quasi-passive nature on special apparatus designed to give opportunity for the execution of repeated movements involving specific joints, has the advantage of isolating particular joints from the rest of the body, and allowing for the construction of special apparatus designed to give repeated exercise under controlled conditions for limited periods of time. These two methods are not mutually exclusive but occupational therapy is the newer and more promising field which has not been developed to any great extent here or abroad.

The disadvantages of the mechanotherapeutic method are that the human body is more than a machine when voluntary movements are concerned and it is very doubtful whether the formal repetition of movement from a mechanical source is of maximum therapeutic value in increasing the amount of movement either in the affected part or as an integral part of the larger coöordination of movement of which each particular movement must ultimately be an essential part. The application of mechanotherapy does not allow for the personal initiative of the subject, gives little or no opportunity for voluntary effort, and offers little incentive for sustained effort.

In the curative shops, ward, and bedside work for occupational therapy, special projects, special machines, and special tools were set aside for strictly curative cases and the instructors checked the movements which each man made in order to see that special joints were not favored or over-fatigued. In the work-shop the patient was a member of a social group and turned out a tangible product of economic value; he was thus brought to full realization of his social fitness and economic usefulness—a factor which is of inestimable value in encouraging and inspiring him.

Where more than one of the activities were equally desirable from the curative standpoint, the one with a vocational outlook was assigned in accordance with the patient's choice and the recommendations of the vocational advisor. Frequently the patient was taken through the shops to observe and to try out the work. Occupational therapy in work with a vocational outlook is, as a rule, preferable and most desirable from many points of view, but fre-

quently patients, whose stay in the hospital was short, preferred to work along the lines of an avocation rather than to return to vocational experiences.

The main divisions into which this work was classified were (a) diversional, (b) occupational, (c) curative, (d) vocational, (e) educational.

*Type Cases in Occupational Therapy (Disabled Elbows)*

1. Private B. N.—Elbow.

*Diagnosis:* Limitation of movement, right elbow.—B. S. W.

*Prescription:* Mobilization right elbow in flexion-extension by work for one hour a day avoiding undue fatigue.

*Assignment:* Carpentry. First project was in making a cigarette case for the Red Cross, doing the entire work himself and working at it in all his spare time. After this he made filing boxes. In both these projects the hammering with small hammer and nails required very slight elbow motion, but the sawing and planing of the wood necessitated elbow extension and flexion. The measurements of the range of voluntary movement showed a slight but steady increase from October 4 to November 2:

October 4, 21 degrees; October 11, 24.5 degrees; October 14, 25.3 degrees; October 25, 28 degrees; October 29, 29.8 degrees; November 2, 29 degrees.

2. Private

*Diagnosis:* G. S. W. forearm right upper 1/3 FCC Radius. Limitation of elbow.

*Prescription:* Flexion-extension elbow; pronation-supination with warning to avoid fatigue of right arm.

*Assignment:* Carpentry (curative) 1:15 to 2:15 P.M., sawing for flexion-extension of elbow, planing for extension of elbow, use of screw-driver for pronation-supination; grasping of any tools for strength of grip. Telegraphy—9:30 to 11:30, though mainly occupational requires slight, quick, extension-flexion of elbow and flexion of fingers.

*Progress of case:* In carpentry worked on an average of six hours a week, making file boxes, looms, rakes (for knitting), picture frames—worked conscientiously and steadily; interested in the work in itself as well as from a curative standpoint. In telegraphy, attended regularly; was a good worker in spite of his disability. He sent twelve words per minute with his right hand, and received at the same speed. His wound prevented greater speed in sending.

Measurements taken in the psychology Laboratory from December 30, 1918, to January 25, 1919, showed the following progress:

MEASUREMENT OF STRENGTH

Elbow, Flexion-Extension

	Left		Right	
	Fl.	Ex.	Fl.	Ex.
Dec. 30.....	26	19		
Jan. 7.....	28.3	20		
9.....	28.6	26.7		
11.....	31.7	27		
16.....	26	26		
18.....	33.3	29.7		
21.....	25.7	27		
25.....	32	29.3		

## MEASUREMENT OF EXTENT

<i>Elbow, Left, Flexion-Extension</i>	<i>Elbow, Left, Pronation-Supination</i>
Dec. 30.....	83
Jan. 3.....	97
9.....	102
11.....	105
16.....	110.7
18.....	118
21.....	121.7
23.....	130.3
Dec. 30.....	85.9
Jan. 3.....	85.9
7.....	127.5
9.....	122.3
11.....	127.0
16.....	119.3
18.....	131.3
21.....	143.7
23.....	150.3

## VI. WARD OCCUPATIONAL THERAPY

From the curative standpoint there is a wide range and a most promising field in the application of ward occupational therapy to restoration of function in orthopedic cases, nerve palsies, amputation and neuro-psychiatric cases. This is in direct line with the policy of the occupational work without the ward in the curative shops and a close coördination has been made between the two since the beginning of the work. With the orthopedic cases the surgeon's diagnosis, his analysis of the movements in the disabled member, and his prescription of the functional result to be attained have been correlated with the analysis of the range and strength of the movements in the psychological laboratories, the analysis of the movements involved in each craft—or shop activity—and the passive exercises in the physiotherapy treatment. This has been carried out in detail for all shop cases and many ward cases.

For example, in ward occupations forcible extension of the fingers may be noted in bookbinding, in spreading paste, in pressing cloth or paper on back of book; leather work, in holding leather flat with one hand, and in tooling with the other, extension of second and third fingers in holding tool; basketry, in keeping reeds in proper position and in raking reeds into place; cord belting, in reaching for cords to tie knots and in holding leaders on which knot is tied; also in weaving, for the *wrist*, flexion (and extension) in making Colonial mats, in weaving, painting and book binding; for the *elbow*, turning the lever in the sock machine, pulling out long cords in making the Macramé belt, working with long reeds in basketry, winding the frame in a Colonial mat; for the *shoulder*, rug weaving; reaching to pull down thread in Gobelin tapestry loom; on jewelry:—slight extension (and flexion) in pulling wire and in hammering: in modeling:—slight shoulder movements in ordinary modelling, the amount varying with size and heaviness of

work; for the *hip*, work which requires use of foot lathes and jig saw adjusted for long and short strokes to increase the range of hip extension; and for the *knee* and *ankle*, in use of treadles in shifting sheds on Lane loom, use of foot treadle in machine for winding yearn, slight extension in use of sweater machine.

Similar remedial exercises have been worked out for abduction, adduction, circumduction, rotation, and other movements of the fingers, wrist, elbow, shoulder, neck, back, hips, knee, ankle and foot.<sup>1</sup>

#### *Development of a Normal Mental Attitude*

The use of handcrafts for patients confined to their beds or to the wards, has been found to have a distinct palliative value through keeping patients occupied, cheerful and in a good mental attitude. The diversional type of work occupies the patient's time, keeps him awake during the day, causes better rest at night, decreases homesickness, prevents prolonged attention to a disability or anticipation of an operation or painful treatment, inhibits worry over minor annoyances and tends to foster normal healthy reactions through the substitution or modification of other more desirable emotional channels.

That this work has been of distinct mental and moral therapeutic value has been apparent within the wards and particularly when comparison has been made with those wards where such treatment is not in vogue. If a patient is not reached when in the acute sick ward he is very apt to become lazy and hospitalized when reaching the convalescent ward, whereas the simplest and sometimes effeminate type of work will awaken his interest to do something and evoke a desire to go on and do more advanced work.

Whenever possible the "manly crafts" and vocational activities are presented and there has been a marked tendency to increase these as the work has progressed; frequently, however, a patient is not in an attitude of mind to consider seriously his past or future vocation. He is weak after a long illness in a medical or surgical ward and he cannot do a man's job but must be given something he can do which will mildly stimulate his interest and offer easy motor reactions without undue fatigue. The activities with color, designs, rhythmic movements and of mechanical import each have their distinct psychological value and appeal aside from the end produced with its practical, decorative, or psycho-social significance

<sup>1</sup> *Op. cit.*

to the maker or the curative value in the restoration of impaired functions.

Schedules of occupational therapy for individual patients in the psychopathic wards whose coöperation could be obtained have been carried out and it has been found that community undertakings, such as ward gardens and auto-repairing have been successful in arousing and maintaining interest. Cases necessarily kept in confinement or in bed have been given bedside handcrafts, and practically every patient has made one or more projects. The agricultural department, with its farm and greenhouses, provides employment for the more serious cases of mental disability which can be given their freedom, and for mental defectives without manual dexterity. The shops, with their manifold opportunities for systematic training in trades and vocations enable patients to regain those objective interests which are the most effective therapeutic agencies in milder forms of mental disorders, in confusional states, etc. The psychologist has maintained an intimate contact with the needs and progress of each individual case and has attempted a graded program of various types of occupational therapy which offer the most advantageous therapeutic activities to the types of cases presented in our wards.

"No single factor exerts a more powerful influence upon the patient's convalescence and subsequent rehabilitation than the mental attitude of the patient himself. The patient who has abandoned hope and who indulges in self-commiseration and gloomy forebodings has reached a condition which thwarts the best efforts of the surgeon and the educator. Lethargy and hospitalization are the inevitable results, and experience in the military hospitals of our allies has shown that, so long as despondency, pessimism, and instability persist, the case is utterly hopeless. On the other hand, a cheerful optimism on the part of the patient, a spirit of self-reliance, and a determination to coöperate are so vitally important as to be indispensable.

That the various types of occupational activity and curative courses have had significant therapeutic and vocational value in many particular cases is apparent to those in close touch with the details of the work."<sup>1</sup>

The presence of well-trained women, occupational aides and medical-social workers, of strong character, lofty purposes and a

<sup>1</sup> BALDWIN, Major Bird T. Helping the Wounded Soldier to "Come Back," *Modern Hospital*, 1919, 12, 370-374.

love and abandon for their art, craft, or subject of instruction or remedial function has been found to have a marked influence on the morale of the patients and their motivation. Their presence has been of distinct value in the Army Hospitals; it was feared by many that they would further complicate the problem of discipline and interfere with the routine of the ward nurses, since the majority of the Aides were of the artistic emotional type with strong individualities of their own and unaccustomed to hospital routine. A few general principles may be gleaned from their work:

1. Their function has been to change the man's mental attitude as far as possible into that of a normal man,—physically, socially, and economically.
2. There has been a constant readaptation of the projects to new types of men that have been admitted, based on changing morale, changing seasons of the year, and the special abilities of the instructor or worker.
3. The bedside occupational activities have been materially extended and systematized into greater projects, with longer and shorter units of work.
4. The occupational work has aimed to increase a man's knowledge and definite tangible evidences of increased skill been shown him from time to time.
5. Group work has been introduced wherever possible although the work has been fundamentally that of individual instruction.
6. The work has aimed to be interesting but the patient has been encouraged to do what seemed most worth while, regardless of how tedious or uninteresting it was, since one of the fundamental problems has been to teach the man sustained effort and habits of industry.
7. A conscious effort has been made to give a patient a man's occupation, when he was able.
8. Ward occupations have not been carried beyond the point where the desired mental and physical improvement has been secured. The improved state of mind has been used to turn the patient's activities toward the curative shops.
9. All patients have been encouraged to do some work and a poor or useless product has been considered better than idleness on the part of the patient.
10. The ward work and the work in the shops has established a new educational principle, namely, that it does not require years for an ambitious young man to learn a craft or a unit of subject matter. If the work is properly organized and the man systematically trained, he may finish with profit a *unit of work* extending from one week to six months.

## VII. AMPUTATES

The psychology of amputation cases is a subject full of interest and opportunities for work primarily in habit-formation. As a rule, these patients are very active when not confined to the bed, and present an apparently optimistic point of view while among their associates in the hospital. Several thousand were treated during the interim included in this report.

Most frequently, directly after an amputation there is a short

period of exaltation on the part of the patient, followed by an extended period which may last a lifetime of suppressed depression due primarily, aside from physiological readjustments, to the realization of the seriousness of the handicap, especially in personal habits of dressing, eating, care of the body, routines of social etiquette, and the consciousness of the loss of a life vocation or profession. A mental reconstruction is necessary, accomplished fundamentally through the building up of a background of self-dependence and self-reliance which requires training and the demonstrations of what others can do with similar handicaps.

### *1. Educating One Arm (or Leg) to Take the Place of Two*

If an arm is amputated at the shoulder, the remaining arm must be trained to take the place of the two arms. Definite training, demonstrations, and practical work have been given the men individually by an instructor with a right-arm amputation, as to the best methods and devices for dressing, tying shoestrings, tying neckties, cleaning and cutting the nails, putting on the collar, eating, and such activities as striking a match upon a matchbox and rolling a cigarette with one hand. It is the ability to do these little things that makes the handicapped man independent in his home, and leads him to experiment with more difficult problems.

### *2. Educating the Active Arm (or Leg)*

If an arm is amputated at the shoulder or near the elbow, the remaining arm must become the active or fundamental arm. When the right arm is amputated in right-handed individuals, the former finer accessory movements of this active arm must be transferred to the left arm. The "stump arm" now becomes the auxiliary arm; the normal arm, the active arm. For example, the patient is taught to write with the left arm. He may be able to write with the prosthesis on right arm, but he is taught to use the remaining or left arm in every way possible, and to rely on the prosthesis with a mechanical attachment as little as possible. In this way the auxiliary arm is trained to become the active arm. Young men soon learn to write well with left arm with good speed by the use of the arm movement method, a ball-pointed pen, and special instructions as to the methods of holding the pen and paper in a position that the hand will not cover the writing. When the auxiliary arm is amputated it is essential to increase the functional ac-

tivities of the active arm to make up the deficiencies necessitated by the limited activity of the auxiliary arm by other types of finer movement exercises, such as piano exercises, typewriting, telegraphy, carving, engraving, croconole, etc. Only six cases of double arm amputations have reported at the hospital and these represent special individual problems.

### *3. Measuring Range and Strength of Movements of Stump Arm or Leg*

It is most desirable to increase the range of motion and strength of the remaining portion of the amputated arm and the methods described in a former monograph,<sup>1</sup> are applicable with slight modifications.

### *4. Educating Auxiliary Arm with Prosthesis, and Exercising Remaining Stump*

If a temporary or provisional prosthesis has been fitted, special attachments have been used in work and play: as, for example, the use of various types of hooks and clamps for shop work, which may be attached to hammers, saws, planes, chisels, or attachments for games, including baseball bat and glove, tennis racket, and various types of apparatus in the gymnasium, such as pulleys, dumb bells, etc. Games have a particular psychological value in that they give the desired exercise, they appeal to play instinct, and aid materially in building up a mental background of self-confidence, self-respect, self-control, and the social coöperation with others.

### *5. Educating Artificial Arm (or Leg)*

The psychologists has been found to be of direct aid in assisting the patient in adjusting himself to the use of an artificial limb and to the best methods of using it effectively in the least extent of time. It is remarkable how much of the inactivity of an artificial arm, or the limb accompanying an artificial leg, is due to habits which can easily be eliminated by a trained psychologist who is familiar with the general principles of motor coöordination; but on the other hand it is inconceivable that an attached prosthesis for either the arm or the leg could ever replace fully the missing member with its dermal and kinesthetic sensations, or the finer coöordinated movements involved in normal activity.

<sup>1</sup> *Op. cit.*

The functional value of an artificial arm is very small compared with that of the normal arm or with the expectancy on the part of the general public as shown by a review made on March, 1918, of several hundred arm amputation cases of long standing and the observation of hospital cases; many patients prefer the empty sleeve to the lifeless mechanical attachment of which they are constantly conscious. As implied above, the patient must be disillusioned in advance from believing that he can find a substitute which will enable him to do the multiple things he did with his normal arm and brought to a full appreciation that the future usefulness of the disabled member lies in the physical development, reeducation, and careful training of the remaining portion supplemented by a few artificial appliances or the adaptation of tools and machines to the remaining portions of the arm. It is on the active arm that he must fundamentally rely, for the new one will always be auxiliary.

It should be noted that since the artificial arm and hand supplied by the hospital are temporary or provisional, and since the hand is largely for esthetic rather than functional purposes, and since the men are discharged as soon as they receive the arm, we have had but little opportunity for training in the use of artificial arms *per se*. Definite training has been given in the use of artificial legs in walking and in the use and exercise of the prosthesis involved in running of lathes, jig saws, knitting machines, foot-looms, grind stones, harness maker's horse, etc.

In the curative shops arm amputation cases, for example, have been successful from the curative and vocational points of view, with the curative aspect fundamentally in prominence in telegraphy, typewriting (a few reaching a maximum of eighty words per minute), stenotypy, bookkeeping, drafting, drawing, cartooning, woodworking, acetylene welding, weaving, jewelry work, engraving, gymnasium work, agriculture and greenhouse work, a few in linotype printing and one with a special appliance in mending, repairing, coloring, and operating moving pictures, but he was refused work by the theaters and moving picture concerns on account of the fire hazards which so frequently arise in connection with the use of the film.

An intensive individual study of non-selected list of eighteen amputation cases (ten arm and eight leg cases), their disabilities, prescriptions (in curative shops) and former schooling and occupations—together with written statements from their medical officers, educational officers, vocational officers, and patients them-

selves, as to whether a change of occupation seemed desirable—resulted in (a) change of occupation desirable, 6; (b) change of occupation not necessitated by nature of disability, 12; (c) change of occupation desired by the patient in order to find one more to his liking, 4 of the 12 under (b).

#### TYPE CASES

##### 1. Pvt. J. A. B. (arm amputation).

July 15, 1918, on Champagne front struck in left elbow by high explosive. Dressing at F.A.S., then to Mobile Hospital No. 1, wound cleaned and fragments removed July 16. Evac. Hospital No. 13—amputation arm middle third, left open. Flaps sutured ten days later. W. R. G. H. September 25, healed, massage, fitted with prosthesis.

Former occupation, farmer. Attended Business College. Future occupation (?). Educational assignment, bookkeeping, assistant in postoffice. Present assignment in training in use of fundamental arm in wood-working shop, physical training and games in gymnasium, including baseball and handball. Personal conferences with instructor (right arm amputation, case of nine years standing) in dressing, care of body, and eating. Training in use of prosthesis with Boller and Manger's hooks in shop, planing, hammering, chiselling.

Muscular strength in pounds: Left Shoulder—Pectoral 30.3, ant. deltoid 29.5, post. deltoid 15.2. Right Shoulder (Normal)—Pectoral 72.7; ant. deltoid 64.7, post. deltoid 63.0.

##### 2. Pvt. C. E. M. (leg amputation).

June 13, 1918, while patient, injured by moving train at La Treport; left leg fractured. Carried to infirmary of Bn. 1, 140 Inf., splints and bandaged. Sent by ambulance to General Hospital No. 16. Leg amputated. September 18, W. R. G. H. Amputation at junction of upper and middle third. September 22 Liberty leg fitted. October 1, 1918, wearing Liberty leg, no ill effects. October 18, recommended discharge, mental and occupational rating.

Alpha mental rating C. Performance scale, C. Well driller 1 year, apprentice rating, in army since eighteenth year. Will resume former occupation of well driller after six months of training in operation and repair of gas engines. Desires also to qualify as oil well driller.

Curative workshop prescription. Active exercise in flexion-extension of knee and hip. Assignment (curative) woodwork, mornings on foot-turning lathe. Adjusted seat which increased the flexion-extension of knee and hip required to turn the lathe. Special project turning out legs for the serving trays used in the wards. Patient walked daily to and from Ward 75 to the Power House for increased exercise. Amputation right leg approximately 4 inches below knee. Muscular strength in pounds: Right knee—Flexion 7.7, extension 37.3. Left knee (Normal)—Flexion 41.3, Extension 90.0.

At the present time a number of public and private hospitals in this country, especially in Pennsylvania, Illinois, Massachusetts, New Jersey, Texas, and California have introduced occupational therapy as an integral part of the hospital life and treatment. The field is directly applicable to those disabled through industry.

## GENERAL REVIEWS AND SUMMARIES

## DRUGS

A. T. POFFENBERGER

*Columbia University*

Miles (9) has supplemented and amplified the work previously done by Dodge and Benedict on the psychophysiological effects of alcohol, by an intensive study of one subject. This subject was chosen from those studied by the earlier workers as the one whose results were the most irregular. The technique of the experiment is practically unchanged and the results confirm the earlier work in showing a depression following alcohol. However, the effect of single doses was studied for a period of five hours, and there was some indication of a facilitation in the reflexes following the primary depression. "Facilitation in these experiments therefore seems limited to the reflexes, and pending the accumulation of data with other subjects it is best to forgo further discussion of the matter here" (p. 129).

Fiske (3) discusses the effects of alcohol upon human efficiency in the light of recent investigations, especially those of the Nutrition Laboratory of the Carnegie Institute. Graham (4) attacks the assertions of the prohibitionists that alcohol is the cause of insanity and quotes from numerous authorities to the effect that alcoholism is a symptom of some underlying fundamental defect rather than a cause. Rowe (10) has made a study of the types of crime committed by persons while intoxicated. Statistics for the study are gathered from various sources. Anderson (1) presents a study of 100 cases of women brought into court for drunkenness. Of these cases, 68 were clearly distinguishable as abnormal mental types, of whom 32 were feeble-minded.

Marks (8) discusses intoxication as a race instinct, and suggests means of combating the increase in the number of drug addicts resulting from the war. Stanley (11) has made a study of 100 cases of morphinism in regard to age at which use began, type of drug, mode of administration, dosage, occupation of the addicts, manner of acquiring the habit, and the physical and mental effects of the use of the drug.

Johnson (5) reports an experimental and statistical study of the effects of tobacco smoking. The conclusion is that smoking "reduces the accuracy and to some extent the efficiency of mental

and motor activity." The investigator recognizes a certain inadequacy of method in the lack of controls, which he thinks is a defect very difficult to overcome. Burnham (2) makes a critical survey of the studies of effects of tobacco on mental and physical functions. He derives a set of conclusions from the survey. A bibliography of 18 titles accompanies the report.

Macht, Isaacs and Greenberg (7) report the effects of such drugs as quinin, aspirin, phenacetin and salol upon reaction times, simple and complex. The effects of this group were found to differ from those of the morphin and opium group in that there was no stage of stimulation. The effects, where evident at all, consisted of a lengthened reaction time, an increased variability or both. Further, the simple reactions were more affected than the complex reactions. It is concluded that the coal tar derivatives act upon "lower synapses" than the opiates.

Lashley (6) measured the effects of strychnine and caffenin upon learning in the albino rat, in order to test the several theories of the physiology of learning. Altho no direct answer to this problem resulted, certain interesting effects of the drugs were noted. "Strychnine sulphate, when administered in doses large enough to produce obvious changes in tonus effects a saving in the amount of practice necessary for learning. Caffein in large doses markedly increases the amount of practice consumed and the retardation of the rate of learning seems proportional to the amount of the drug administered."

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## READING

By E. H. CAMERON  
*Yale University*

Breed (1) has made a comparative study of tests commonly used for comprehension in reading. Thorndike's question method and Starch's reproduction method were both used on the same groups of children. A lack of correlation was shown to exist between the results of the two tests. Breed concludes that they measure different phases of comprehension. For theoretical reasons he prefers the Thorndike test for the purpose.

An interesting study of comprehension by Wembridge and Means (2) was suggested by the results of the voting in various states on questions which were put before the voters in negative form. Experimental investigation showed that where questions are asked in this form subjects make replies which are directly opposite in fact to what is intended in a large percentage of cases.

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## REACTION TIME

BY V. A. C. HENMON  
*The University of Wisconsin*

Angell (1) reports a continuation of work with his trigger reaction key on the relations of length and strength of pull to other factors entering into reactions. The preliminary study with one reagent had shown no constant ratios between the length of reaction time and the strength and length of pull. The results with four subjects showed that if there is any correspondence between the reagent's attitude and reaction times, none is indicated between attitude and duration of movement. Not infrequently cases of secondary reactions or double pulls occurred, which raised the question as to the length of reaction time when the reacting member is already in motion. These so-called flying reactions are quicker than the simple even when moving against a stronger spring tension. The writer refers this fact to physiological factors, that in the flying reaction the antagonistic muscle is already relaxed by the

preliminary pull, a condition which would naturally bring about the most noticeable marks of these movements, namely, the slower motion and the quicker reaction.

Macht, Isaacs and Greenberg (2), in continuation of an earlier study which reported results on the effects of opium and morphin on reaction time, give results of the effects of antipyretics. The drugs given in therapeutic doses were quinin, acetanilid, phenacetin, antipyrin, salol, aspirin, and pyramidon. Simple sound, touch, and light reactions, and association reactions involved in mental addition or multiplication were measured. The conclusions reached were that (1) all the antipyretics with the possible exception of quinin tend to impair or retard reaction times, (2) simple reactions are more affected than complex reactions, (3) combinations of antipyretics give results explicable by addition of the effects of components, (4) greater change in simple reactions seems to point to the seat of action of antipyretics as being in some lower synapse than that affected by morphin or opium.

Titchener (3) reports a special study of reactions by a subject who in a previous investigation was unable to maintain the required constancy of attitude and whose times were long and very variable even after much practice. The subject apparently reacts in a sensory attitude to motor instructions and in a cognitive attitude to sensory instructions. In spite of continued practice the mean variations remain very high and the reaction times are long.

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## SPECIAL REVIEWS

*Jesus, the Christ, in the Light of Psychology.* G. STANLEY HALL.  
New York: Doubleday, Page, 1917. 2 vols. Pp. xix + 733.

As the author says, he is here a pioneer in a new domain. Textual and historical studies need to be supplemented and transcended by psychological interpretations. "The certain data are so meager, gappy, and contradictory, that psychology must, even more than it has of late, become henceforth our chief guide." This he regards as the brightest hope of Christianity. Experimental, introspective and behavioristic psychology have not been so important for the present work as genetic and folk psychology. Much use is made of Freudian concepts. Durkheim's studies are also in evidence. The author clings tenaciously to the much criticized theory of the recapitulation of the epochs of racial development, in the individual. An amazing amount of literature in biblical and theological subjects is cited and in some instances it has drawn the author far afield.

The main thesis of the work is that the new eschatological, psychological Jesus as presented in these pages can afford satisfaction for the cultural needs of religion (p. 113). Current orthodoxy is repudiated yet the author's studies have made it possible for him to "repeat almost every clause of the Apostles' Creed with a fervent sentiment of conviction." Not a clause of it is true in the usual meaning but all of it is true in a far higher sense (p. xviii). The historicity of Jesus is apparently maintained though it is asserted that this is not of great importance. There is little doubt, however, that this assumption of historicity gives a tone of reality and a degree of force to the psychological analysis which it would be difficult to attain otherwise. For example, the sermon on the mount is referred to as embodying the most essential teachings of Jesus. In the parables "we see farthest into Jesus' own heart." The miracles, though rejected as actual events, are accepted in their deeper meanings and every one of them is held to shed light on the inner life of Jesus (p. 595). This will seem like playing fast and loose with the subject to many readers and it must be difficult for the most nimble. Compared to the inwardization of Jesus, Dr. Hall regards Berkeley's subjectivization of the outer world only a parody (p. 337).

The sources of the great Christian conceptions are to be sought in the soul of the race, in "Man-soul." The events in the life of

Jesus have their significance as symbolizations of inner processes in the depths of human nature in its ascent from the animal to a spiritual state of existence. Thus the pity felt for Jesus' agonies is really self-pity on the part of man himself. "Only because of man's persistent ejective habit of thought is it hard to realize that it is all only a projection into the field of history of an internal process" (cf. pp. 235, 281). Jesus was the perfect totemic man. In his death the old degenerate God, Yahveh, was slaughtered. In the resurrection, the folk-soul brought to life the new God of Christian faith. "In raising Jesus from the dead Man-soul raised both God and itself, and entered a new world as a new creature" (p. 733).

This general thesis is developed through a wide range of topics beginning with the question of Jesus' Physical Personality. There is the greatest diversity in the pictures and statues showing that his personality has been left plastic to artistic imagination." All portraits of Jesus are thus mental imagery, as much so as if no such person ever lived." These ideal constructions of the artists are no more subjective and expressive of different norms than are the literary and doctrinal interpretations. The realization of this fact enables the genetic psychologist to understand Jesus more adequately and to see him as "the greatest projection that the folk-soul ever made."

The chapter on Jesus in Literature gives striking evidence of the author's capacity for marshalling in summary form an enormous body of rich and suggestive material. Probably nowhere else can one find in such condensed and effective presentation such diverse writings dealing with this subject. Included in this review are the works of the early apocryphal writers, medieval churchmen, modern story-tellers, novelists, dramatists, exponents of cryptic cults, and those who have described Jesus as a moron, epileptic, or otherwise defective. Of the works which employ psychological methods those are first discussed which are negative and antagonistic. Jesus is regarded by some of these as handicapped by heredity, by others as a paranoiac, as ecstatic; as a fanatic or as having a tragedy behind his baptism and ministry. Nietzsche is the bitterest enemy of Jesus and the Church in modern times and his views are given at length. More than fifty pages are devoted to those who regard Jesus as a myth and it is concluded that historic reality is of less importance than either the orthodox or their opponents suppose. "Why, indeed, should it make any more practical dif-

ference than it does to physics and chemistry whether atoms and ions are material bodies or immaterial centers of energy, or than it makes to the Swiss peasants whether William Tell was a person or a solar myth?"

Other topics to which separate chapters are given are: the Nativity, Palestine in Jesus' day with a survey of his social *milieu*, Messianity, Jesus' Eschatology, his Ethics and Prayer, Parables, Miracles, and his Death and Resurrection. It would have been interesting and valuable if a concluding chapter had been added presenting more completely than has anywhere been done the *ensemble* of qualities which this psychologist mentions. Descriptions of particular characteristics are to be found here and there but they might well be brought together in what would be the psychologist's portrait.

This would include the following fundamental components. In Jesus, as in every individual, slumbered a racial soul. The Hebrew mind of his time was full of Messianic hopes of a predominantly ethical kind. He knew these Messianic ideals before he felt any personal relation to them. Gradually his individual consciousness passed into the larger consciousness of the race. "He came to think, feel and act in super-individual or genetic terms." He projected and hypostatized this larger consciousness, interpreting it partly as Godhead and partly as the Kingdom. Thus he illustrates "psychic euthanasia." He was reared in poverty and believed the end of the world was at hand. He extolled poverty. "Jesus foresaw neither the Church, science, modern industrialism, law, courts, nor medicine, and had no conception of statecraft. But he did see, as no one before or since has seen, the principle of service and mutuality." He had an invincible sense of his own superiority over other men, and he concealed this sense of inner divinity from the world. This gave rise to a conflict of opposite impulsions which kept him alert, keen, and charged to the saturation point with energy. He lived under the power of a supreme wish supremely repressed. From this tension which was augmented by persecution and threatened death, certain traits developed. He was highly sensitive to pleasure and pain. He had great power of love and hate. He possessed ecstatic and abounding life, joyous and free, and attained an unconquerable spirit which defied even death.

The work as a whole would have been more valuable as a psychological treatise if it had been half as long, omitting extended discussions of questions which belong to historical and theological

domains. In spite of diffuseness, lack of close organization, and a marvelously unfamiliar vocabulary it is a stimulating and profitable work to students in this field. The author does not conceal the fact that he has a vital, practical interest in the subject and that he believes studies of this kind are necessary means to freer, more intelligent and more helpful religious faith.

E. S. AMES

UNIVERSITY OF CHICAGO

